FCC RADIO TEST REPORT

FCC ID	:	**IHDT56XM1**
Equipment	:	**Mobile Cellular Phone**
Brand Name	:	**Motorola**
Model Name	:	**XT2000-2**
Applicant	:	**Motorola Mobility, LLC 222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States**
Manufacturer	:	**Motorola Mobility, LLC 222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States**
Standard	:	**47 CFR Part 2, 22(H), 24(E), 27**

The product was received on Aug. 14, 2019 and testing was started from Aug. 21, 2019 and completed on Aug. 28, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FG981414B	01	Initial issue of report	Oct. 28, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§22.913 (a)(2)	Effective Radiated Power (Band 5)	Pass	
	§27.50 (b)(10)	Effective Radiated Power (Band 13)		
	§24.232 (c) §27.50 (h)(2)	Equivalent Isotropic Radiated Power (Band 2) (Band 7) (Band 38)		
	§27.50 (d)(4)	Equivalent Isotropic Radiated Power (Band 4) (Band 66)		
3.3	§24.232 (d) §27.50 (d)(5)	Peak-to-Average Ratio	Pass	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2)(4) §27.53 (h)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 13) (Band 66)	Pass	-
	§2.1051 §27.53 (m)(4)	Conducted Band Edge Measurement (Band 7) (Band 38)		
3.6	§2.1051 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (h)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 13) (Band 66)	Pass	-
	§2.1051 §27.53 (m)(4)	Conducted Spurious Emission (Band 7) (Band 38)		

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.7	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §22.917 (a) §24.238 (a) §27.53 (c)(2) §27.53 (f) §27.53 (h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 13) (Band 66)	Pass	Under limit 20.11 dB at 10278.000 MHz
	§2.1053 §27.53 (m)(4)	Radiated Spurious Emission (Band 7) (Band 38)		
Remark: This is a variant report by enable LTE Band 38. All the test cases were performed on original report which can be referred to Sporton Report Number FG912419B. Based on the original report, the test cases were verified.				

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Wii Chang

Report Producer: Yimin Ho

1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2000-2
FCC ID	IHDT56XM1
IMEI Code	**Conducted:** IMEI: 355573090024362 **Radiation:** IMEI: 355573090024511
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/GNSS/NFC WLAN 11b/g/n HT20 WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	PVT-2
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer.

Accessory List	
AC Adapter 1	Brand Name : Motorola
	Model Name : SC-71
	Manufacturer : Salom
AC Adapter 2	Brand Name : Motorola
	Model Name : SC-51
	Manufacturer : Salom
AC Adapter 3	Brand Name : Motorola
	Model Name : SC-51
	Manufacturer : Chenyang
AC Adapter 4	Brand Name : Motorola
	Model Name : SC-57
	Manufacturer : Salom/Flex
AC Adapter 5	Brand Name : Motorola
	Model Name : SC-57
	Manufacturer : Tenpao/Cliptech
Battery 1	Brand Name : Motorola
	Model Name : KV30
	Manufacturer : Amperex
Battery 2	Brand Name : Motorola
	Model Name : KV40
	Manufacturer : Amperex
USB-C Headset	Brand Name : Motorola
	Model Name : SH38C48284
	Manufacturer : Grandsun
Headset Jack Adaptor	Brand Name : Motorola
	Model Name : SC18C45885
	Manufacturer : Luxshare
USB-C Data Cable	Brand Name : Motorola
	Model Name : SC18C45884
	Manufacturer : Luxshare

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 38: 2572.5 MHz ~ 2617.5 MHz
Rx Frequency	LTE Band 38: 2572.5 MHz ~ 2617.5 MHz
Bandwidth	LTE Band 38: 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 38: 22.83 dBm
Antenna Type	Fixed Internal Antenna and Dynamic Antenna
Antenna Gain	LTE Band 38: -6.0 dBi
Type of Modulation	QPSK / 16QAM / 64QAM

1.3 Modification of EUT

No modifications are made to the EUT during all test items.

1.4 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

LTE Band 38		QPSK			16QAM			64QAM		
BW (MHz)	**Frequency Range (MHz)**	**Emission Designator (99%OBW)**	**Frequency Tolerance (ppm)**	**Maximum EIRP(W)**	**Emission Designator (99%OBW)**	**Frequency Tolerance (ppm)**	**Maximum EIRP(W)**	**Emission Designator (99%OBW)**	**Frequency Tolerance (ppm)**	**Maximum EIRP(W)**
5	2572.5 ~ 2617.5	4M51G7D	-	0.0476	4M49W7D	-	0.0385	4M51W7D	-	0.0303
10	2575.0 ~ 2615.0	9M05G7D	0.0039	0.0478	9M09W7D	-	0.0385	9M07W7D	-	0.0304
15	2577.5 ~ 2612.5	13M4G7D	-	0.0473	13M5W7D	-	0.0385	13M5W7D	-	0.0310
20	2580.0 ~ 2610.0	17M9G7D	-	0.0482	17M8W7D	-	0.0382	18M0W7D	-	0.0308

1.5 Testing Location

Test Site	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	TH05-HY	03CH07-HY
Test Engineer	Aking Chang	Ken Wu, Jesse Wang
Temperature	25~26°C	22.4~25.5°C
Relative Humidity	54~56%	56~65%

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC Designation No.: TW1190

1.6 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.26-2015
- ANSI / TIA-603-E
- 47 CFR Part 2, 22(H), 24(E), 27
- FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

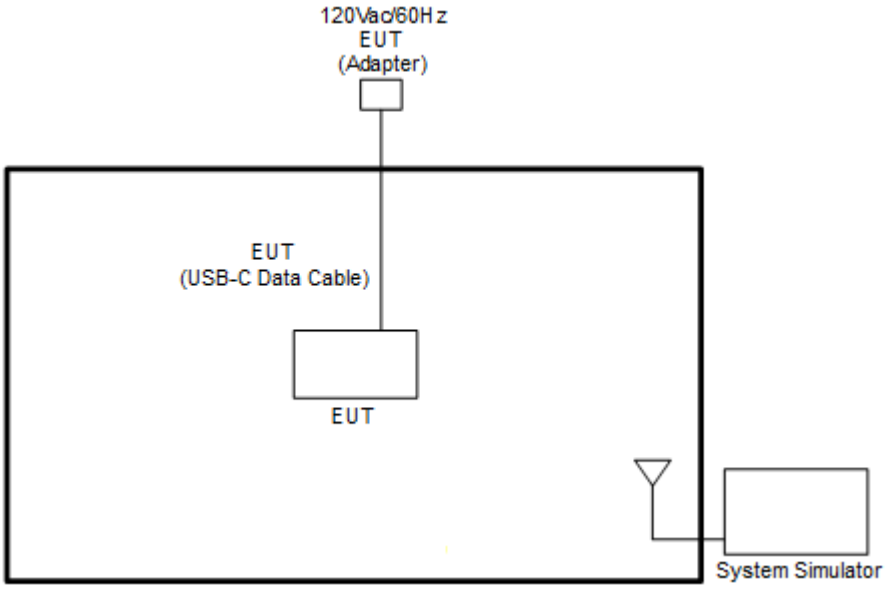
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v03r01 with maximum output power.

For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	38	-	-	v	v	v	v	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	38	-	-				v	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	38	-	-	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	38	-	-	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	38	-	-	v	v	v	v	v	v	v	v			v	v	v
Frequency Stability	38	-	-		v			v					v		v	
E.I.R.P	38	-	-	v	v	v	v	v	v	v	v			v	v	v
Radiated Spurious Emission	38	Worst Case												v	v	v
Remark	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 38 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	37850	38000	38150
	Frequency	2580.0	2595.0	2610.0
15	Channel	37825	38000	38175
	Frequency	2577.5	2595.0	2612.5
10	Channel	37800	38000	38200
	Frequency	2575.0	2595.0	2615.0
5	Channel	37775	38000	38225
	Frequency	2572.5	2595.0	2617.5

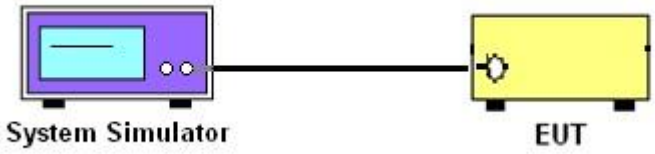
3 Conducted Test Items

3.1 Measuring Instruments

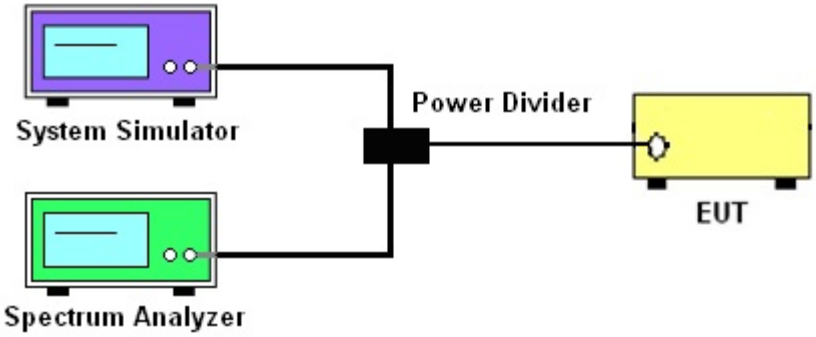
See list of measuring instruments of this test report.

3.1.1 Test Setup

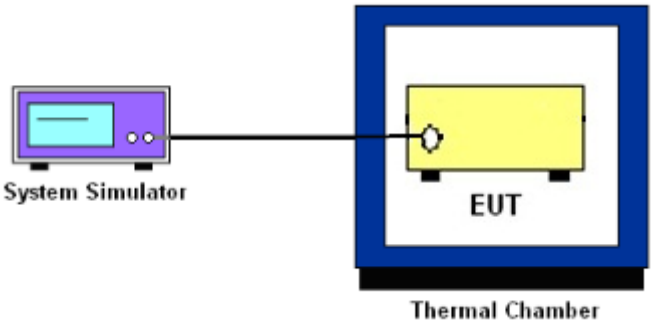
3.1.2 Conducted Output Power



3.1.3 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.1.4 Frequency Stability



3.1.5 Test Result of Conducted Test

Please refer to Appendix A.

3.2 Conducted Output Power and EIRP

3.2.1 Description of the Conducted Output Power Measurement and EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 38.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.2.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

3.3 Peak-to-Average Ratio

3.3.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.3.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.2.6

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.4 Occupied Bandwidth

3.4.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.4.2 Test Procedures

The testing follows ANSI C63.26-2015 Section 5.4.3 (26dB) and Section 5.4.4 (99OB)

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
3. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
4. Set the detection mode to peak, and the trace mode to max hold.
5. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace.
   (this is the reference value)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.5 Conducted Band Edge

3.5.1 Description of Conducted Band Edge Measurement

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

3.5.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
8. For LTE Ban 38, the other 40 dB, and 55 dB have additionally applied same calculation above.

3.6 Conducted Spurious Emission

3.6.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For Band 38:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.1.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
10. For Band 38

    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

3.7 Frequency Stability

3.7.1 Description of Frequency Stability Measurement

27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at 20±5° C and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

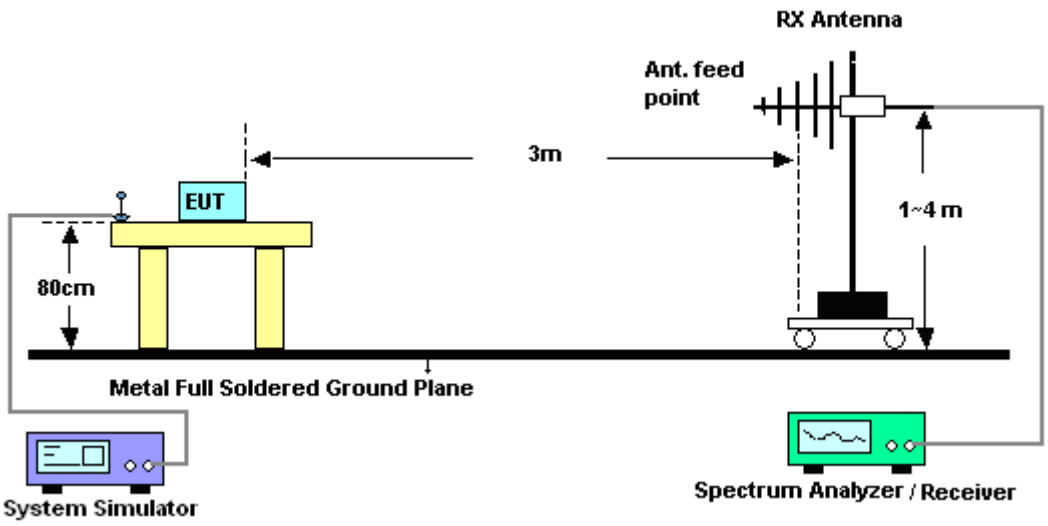
4 Radiated Test Items

4.1 Measuring Instruments

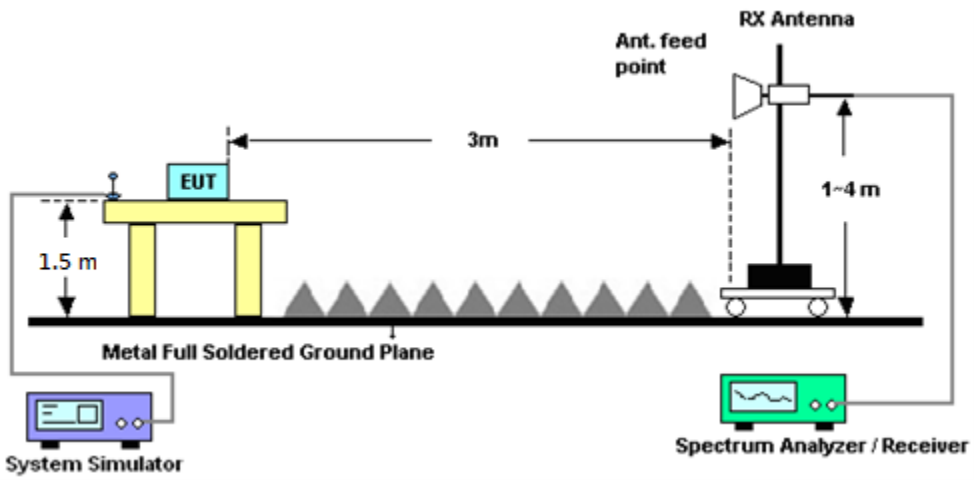
See list of measuring instruments of this test report.

4.1.1 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



4.1.2 Test Result of Radiated Test

Please refer to Appendix B.

4.2 Radiated Spurious Emission Measurement

4.2.1 Description of Radiated Spurious Emission Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 7 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
11. For Band 38:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
    ERP (dBm) = EIRP - 2.15

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
LTE Base Station	Anritsu	MT8820C	6201432821	GSM/GPRS /WCDMA/LTE	Oct. 14, 2018	Aug. 21, 2019~ Aug. 22, 2019	Oct. 13, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 13, 2018	Aug. 21, 2019~ Aug. 22, 2019	Nov. 12, 2019	Conducted (TH05-HY)
Temperature Chamber	ESPEC	SH-641	92013720	-40℃~90℃	Aug. 29, 2018	Aug. 21, 2019~ Aug. 22, 2019	Aug. 28, 2019	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 02, 2018	Aug. 21, 2019~ Aug. 22, 2019	Oct. 01, 2019	Conducted (TH05-HY)
Coupler	Warison	20dB 25W SMA Directional Coupler	#A	1-18GHz	Jan. 14, 2019	Aug. 21, 2019~ Aug. 22, 2019	Jan. 13, 2020	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	35419 & 03	30MHz~1GHz	Apr. 30, 2019	Aug. 26, 2019~ Aug. 28, 2019	Apr. 29, 2020	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Dec. 02, 2018	Aug. 26, 2019~ Aug. 28, 2019	Dec. 03, 2019	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A (MXE)	MY53290053	20Hz~26.5GHz	Jan. 23, 2019	Aug. 26, 2019~ Aug. 28, 2019	Jan. 22, 2020	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-00101 800-30-10P	1590075	1GHz~18GHz	Apr. 24, 2019	Aug. 26, 2019~ Aug. 28, 2019	Apr. 23, 2020	Radiation (03CH07-HY)
Preamplifier	COM-POWE R	PA-103A	161241	10MHz~1GHz	May 20, 2019	Aug. 26, 2019~ Aug. 28, 2019	May 19, 2020	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~26.5GHz	Nov. 02, 2018	Aug. 26, 2019~ Aug. 28, 2019	Nov. 01, 2019	Radiation (03CH07-HY)
Filter	Microwave	H3G018G1	SN477220	3GHz High Pass Filter	Nov. 02, 2018	Aug. 26, 2019~ Aug. 28, 2019	Nov. 01, 2019	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4, MY28655/4	9kHz~30MHz	Feb. 26, 2019	Aug. 26, 2019~ Aug. 28, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	30MHz~1GHz	Feb. 26, 2019	Aug. 26, 2019~ Aug. 28, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4, MY24971/4, MY15682/4	1GHz~18GHz	Feb. 26, 2019	Aug. 26, 2019~ Aug. 28, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2858/2	18GHz~40GHz	Feb. 26, 2019	Aug. 26, 2019~ Aug. 28, 2019	Feb. 25, 2020	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Aug. 26, 2019~ Aug. 28, 2019	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Aug. 26, 2019~ Aug. 28, 2019	N/A	Radiation (03CH07-HY)
Horn Antenna	ESCO	3117	00211469	1GHz~18GHz	Aug. 20, 2019	Aug. 26, 2019~ Aug. 28, 2019	Aug. 19, 2020	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 18, 2019	Aug. 26, 2019~ Aug. 28, 2019	Apr. 17, 2020	Radiation (03CH07-HY)
Signal Generator	Anritsu	MG3694C	163401	0.1Hz~40GHz	Jan. 21, 2019	Aug. 26, 2019~ Aug. 28, 2019	Jan. 20, 2020	Radiation (03CH07-HY)

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.05

Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.44

Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	3.95

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 38 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.74	22.83	22.73
20	1	49		22.72	22.72	22.64
20	1	99		22.56	22.79	22.77
20	50	0		21.72	21.76	21.74
20	50	24		21.71	21.71	21.68
20	50	50		21.62	21.80	21.75
20	100	0		21.72	21.80	21.78
20	1	0	16-QAM	21.69	21.72	21.76
20	1	49		21.57	21.82	21.69
20	1	99		21.69	21.62	21.75
20	50	0		20.74	20.71	20.81
20	50	24		20.74	20.68	20.83
20	50	50		20.60	20.68	20.72
20	100	0		20.54	20.72	20.82
20	1	0	64-QAM	20.68	20.73	20.73
20	1	49		20.67	20.66	20.76
20	1	99		20.63	20.66	20.88
20	50	0		19.69	19.77	19.81
20	50	24		19.66	19.64	19.78
20	50	50		19.62	19.62	19.72
20	100	0		19.69	19.61	19.69
15	1	0	QPSK	22.74	22.73	22.75
15	1	37		22.56	22.65	22.58
15	1	74		22.65	22.74	22.72
15	36	0		21.67	21.67	21.83
15	36	20		21.58	21.76	21.80
15	36	39		21.63	21.83	21.81
15	75	0		21.65	21.77	21.75
15	1	0	16-QAM	21.64	21.67	21.85
15	1	37		21.65	21.72	21.73
15	1	74		21.52	21.81	21.77
15	36	0		20.73	20.68	20.82
15	36	20		20.73	20.69	20.86
15	36	39		20.70	20.69	20.75
15	75	0		20.67	20.76	20.79
15	1	0	64-QAM	20.61	20.80	20.77
15	1	37		20.63	20.62	20.69
15	1	74		20.61	20.70	20.92
15	36	0		19.62	19.78	19.79
15	36	20		19.54	19.78	19.74
15	36	39		19.74	19.65	19.75
15	75	0		19.66	19.73	19.87

LTE Band 38 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.79	22.79	22.71
10	1	25		22.54	22.64	22.58
10	1	49		22.64	22.71	22.77
10	25	0		21.72	21.77	21.81
10	25	12		21.56	21.84	21.73
10	25	25		21.52	21.71	21.82
10	50	0		21.67	21.76	21.72
10	1	0	16-QAM	21.70	21.85	21.80
10	1	25		21.70	21.65	21.74
10	1	49		21.68	21.80	21.72
10	25	0		20.61	20.69	20.75
10	25	12		20.70	20.80	20.81
10	25	25		20.62	20.81	20.69
10	50	0		20.72	20.68	20.90
10	1	0	64-QAM	20.71	20.67	20.74
10	1	25		20.57	20.67	20.83
10	1	49		20.65	20.64	20.76
10	25	0		19.55	19.77	19.90
10	25	12		19.60	19.77	19.75
10	25	25		19.64	19.68	19.82
10	50	0		19.66	19.72	19.76
5	1	0	QPSK	22.77	22.78	22.78
5	1	12		22.61	22.60	22.63
5	1	24		22.62	22.72	22.77
5	12	0		21.68	21.86	21.74
5	12	7		21.60	21.73	21.77
5	12	13		21.71	21.81	21.79
5	25	0		21.69	21.62	21.62
5	1	0	16-QAM	21.70	21.85	21.83
5	1	12		21.53	21.71	21.84
5	1	24		21.66	21.82	21.63
5	12	0		20.59	20.69	20.92
5	12	7		20.70	20.64	20.89
5	12	13		20.60	20.67	20.88
5	25	0		20.71	20.64	20.76
5	1	0	64-QAM	20.67	20.79	20.82
5	1	12		20.71	20.65	20.73
5	1	24		20.61	20.64	20.74
5	12	0		19.63	19.76	19.79
5	12	7		19.71	19.69	19.76
5	12	13		19.59	19.75	19.74
5	25	0		19.56	19.65	19.71

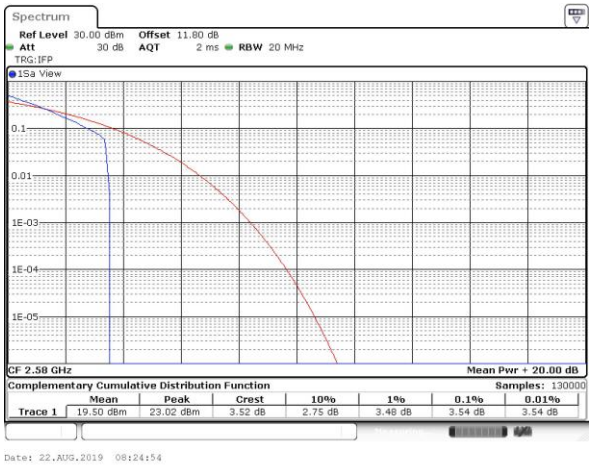
LTE Band 38

Peak-to-Average Ratio

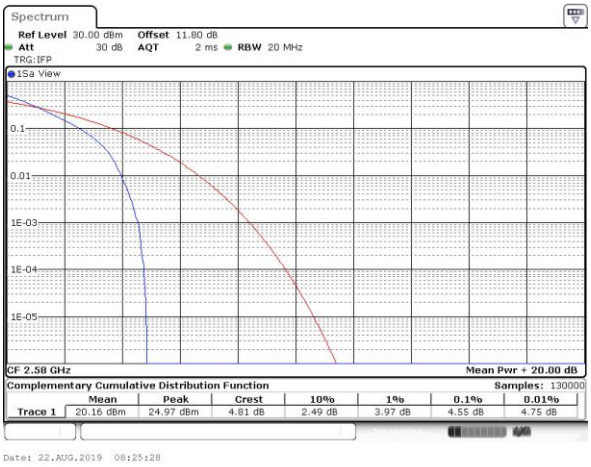
Mode	LTE Band 38 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	3.54	4.55	4.23	5.86	PASS
Middle CH	3.51	4.46	4.35	5.45	
Highest CH	3.65	4.38	4.38	5.45	
Mode	LTE Band 38 / 20MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	5.04	6.35	-	-	PASS
Middle CH	5.16	6.38	-	-	
Highest CH	5.62	6.26	-	-	

LTE Band 38 / 20MHz / QPSK

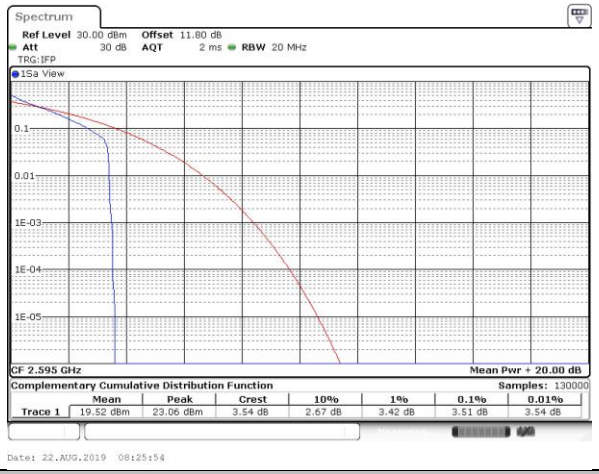
Lowest Channel / 1RB



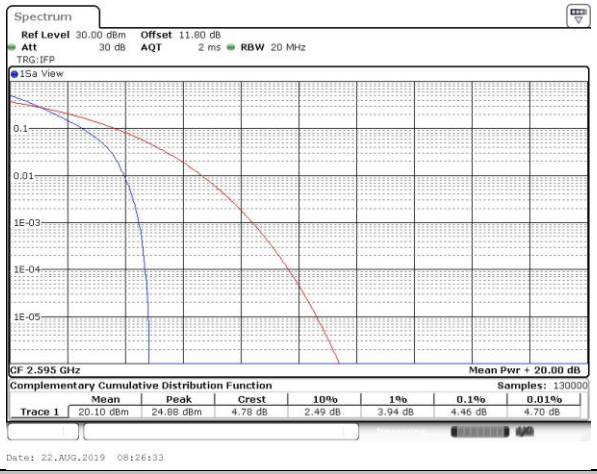
Lowest Channel / Full RB



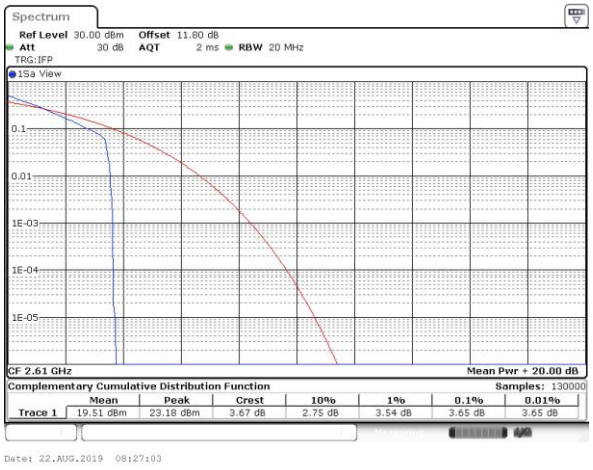
Middle Channel / 1RB



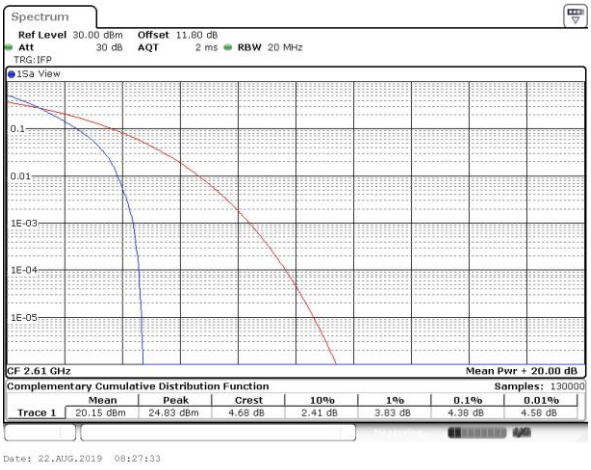
Middle Channel / Full RB



Highest Channel / 1RB

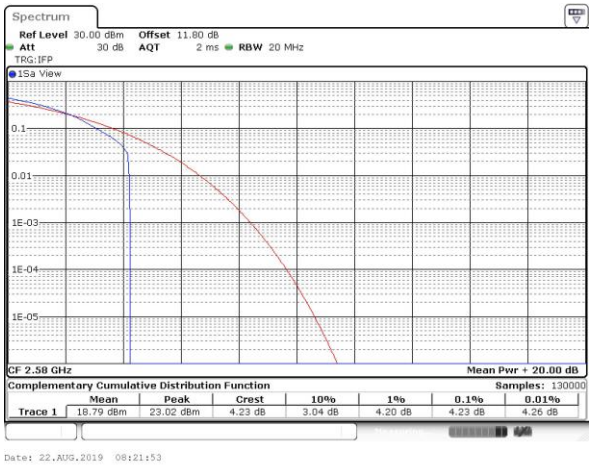


Highest Channel / Full RB

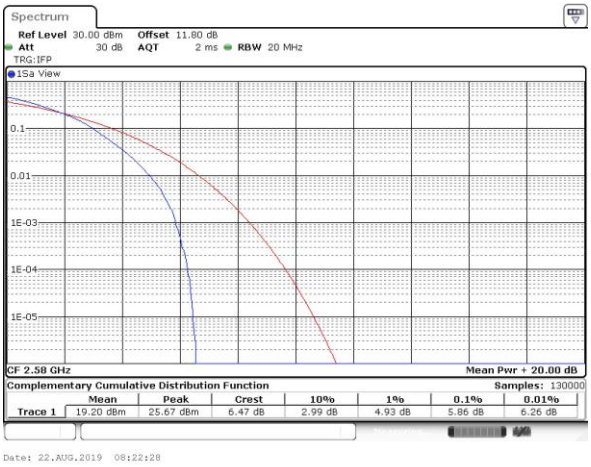


LTE Band 38 / 20MHz / 16QAM

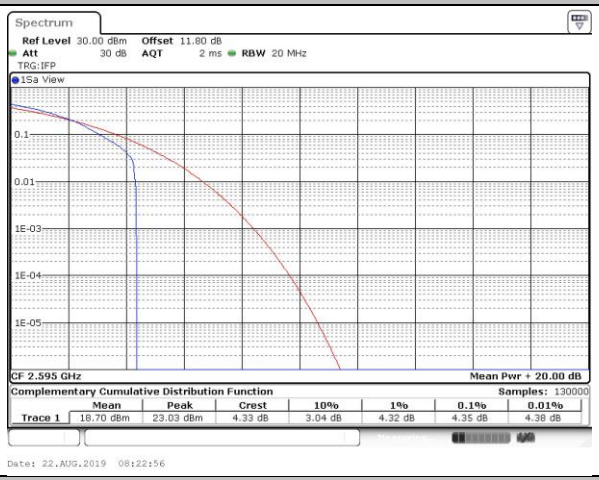
Lowest Channel / 1RB



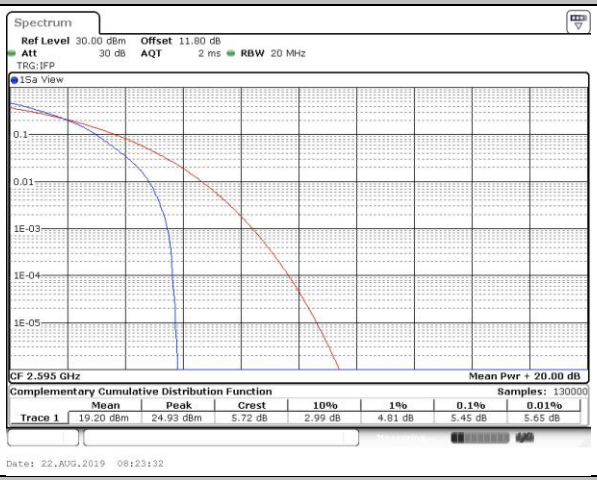
Lowest Channel / Full RB



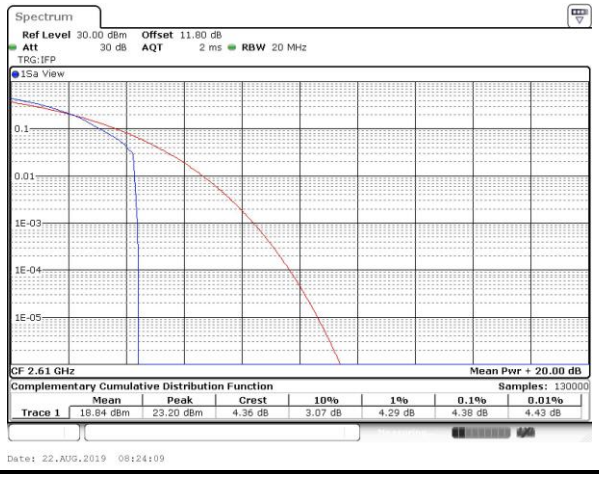
Middle Channel / 1RB



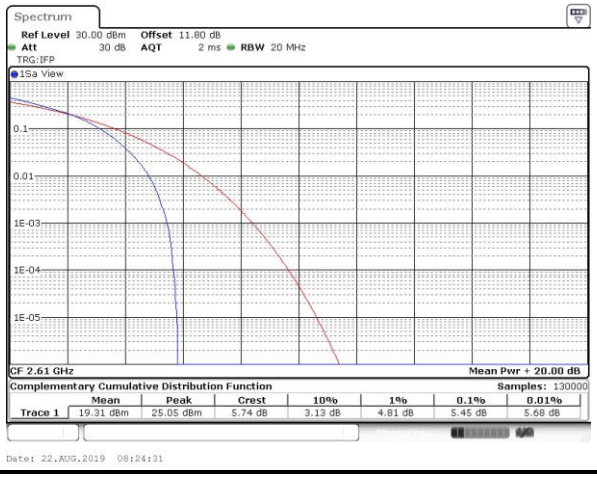
Middle Channel / Full RB



Highest Channel / 1RB

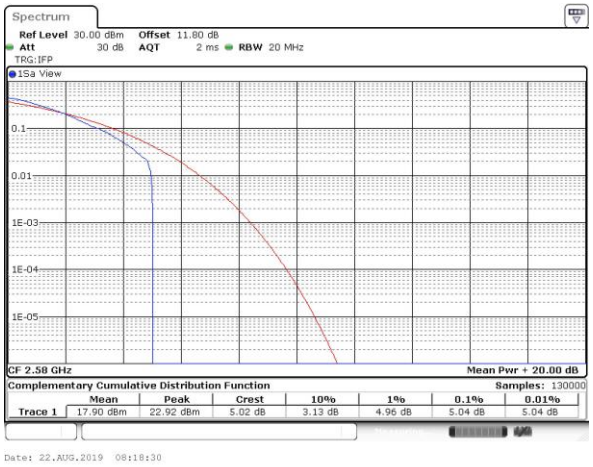


Highest Channel / Full RB

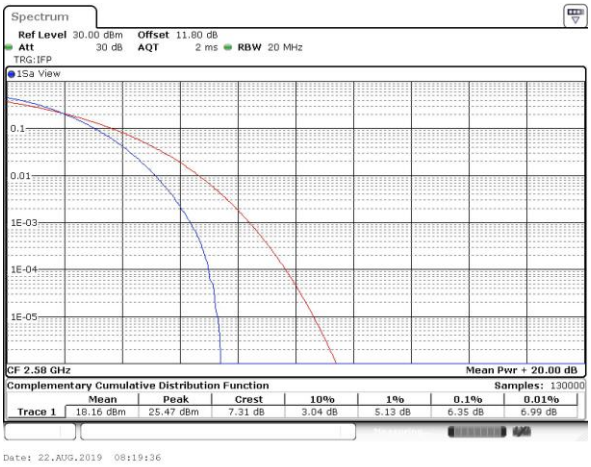


LTE Band 38 / 20MHz / 64QAM

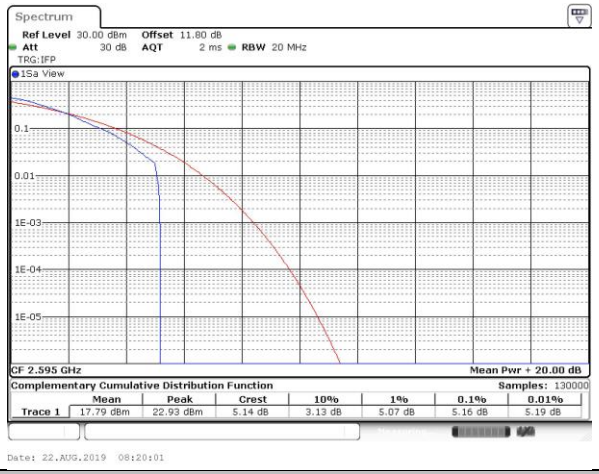
Lowest Channel / 1RB



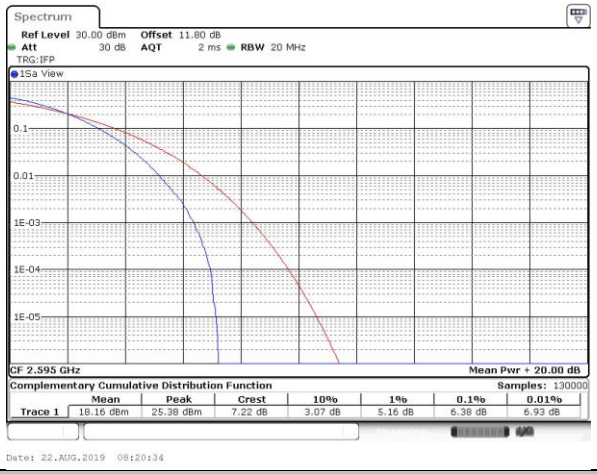
Lowest Channel / Full RB



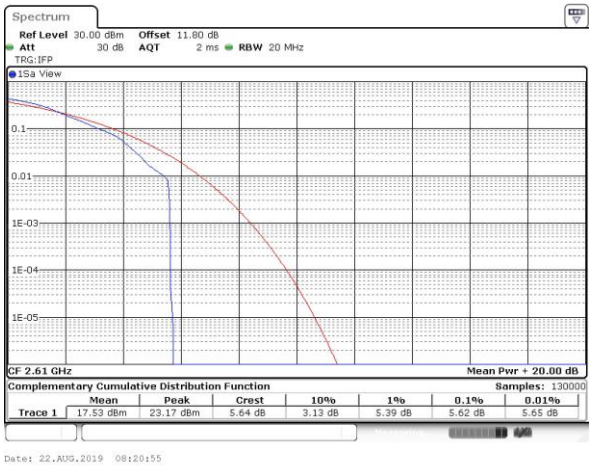
Middle Channel / 1RB



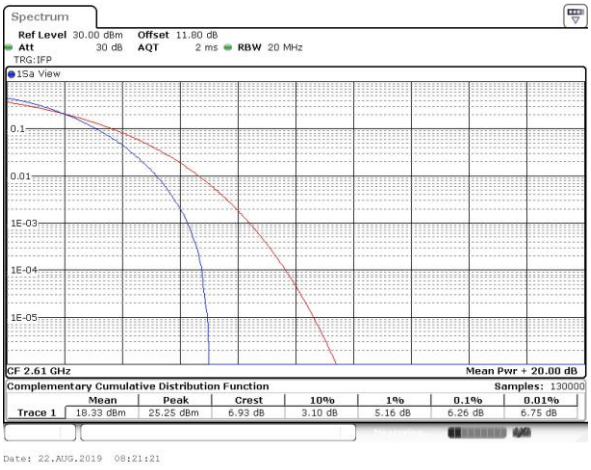
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB

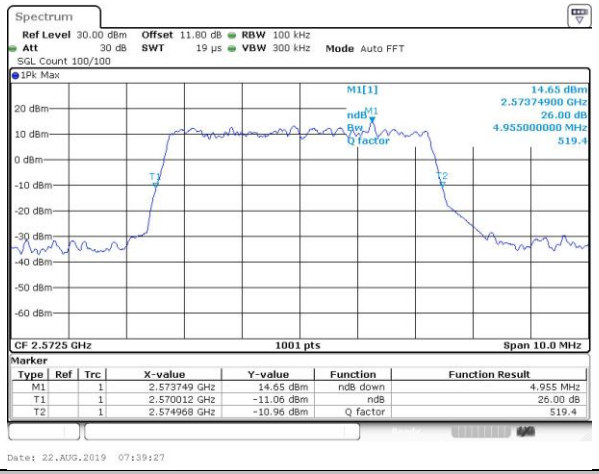


26dB Bandwidth

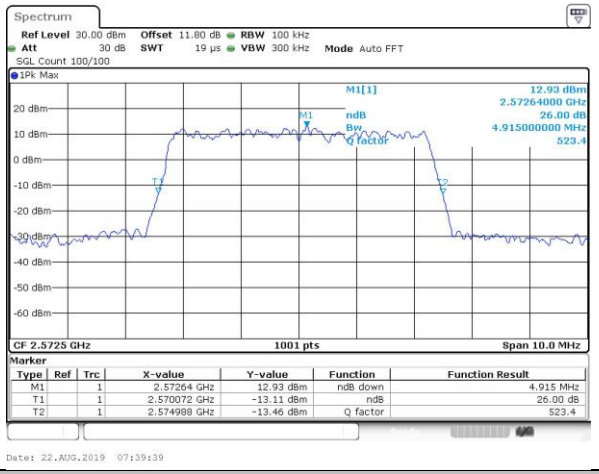
Mode	LTE Band 38 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.96	4.92	9.79	9.61	14.27	14.39	18.78	18.90
Middle CH	-	-	-	-	4.89	5.03	9.67	9.69	14.12	14.27	18.66	19.02
Highest CH	-	-	-	-	4.95	4.86	9.81	9.85	14.51	14.12	18.66	19.14
Mode	LTE Band 38 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.79	-	9.71	-	14.33	-	19.18	-
Middle CH	-	-	-	-	4.76	-	9.61	-	14.60	-	19.02	-
Highest CH	-	-	-	-	4.90	-	9.73	-	14.24	-	18.82	-

LTE Band 38

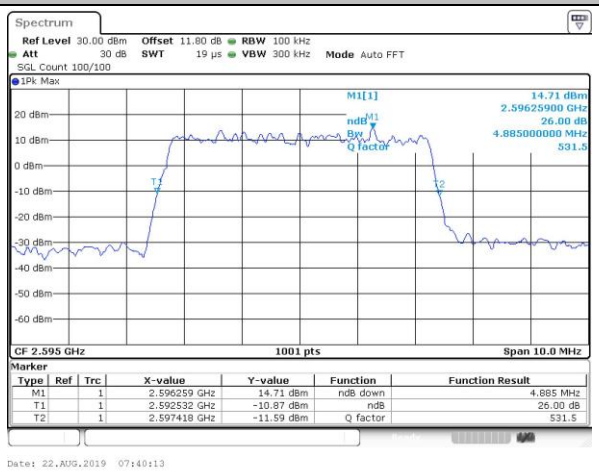
Lowest Channel / 5MHz / QPSK



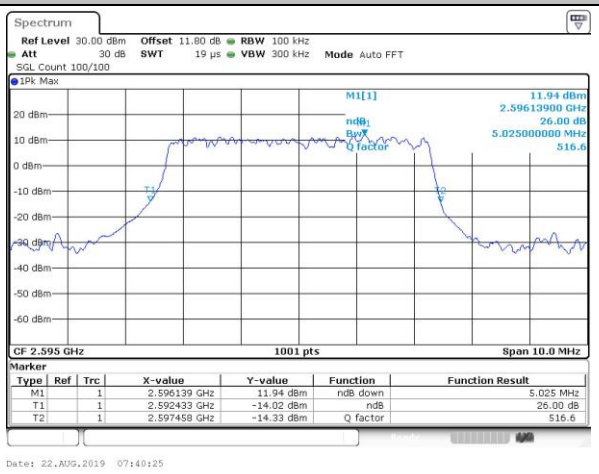
Lowest Channel / 5MHz / 16QAM



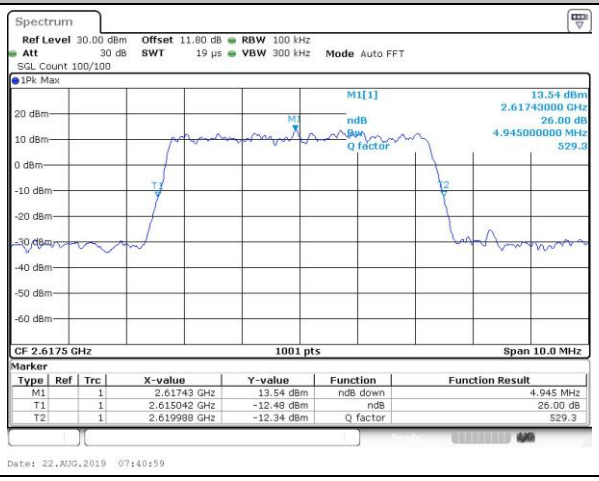
Middle Channel / 5MHz / QPSK



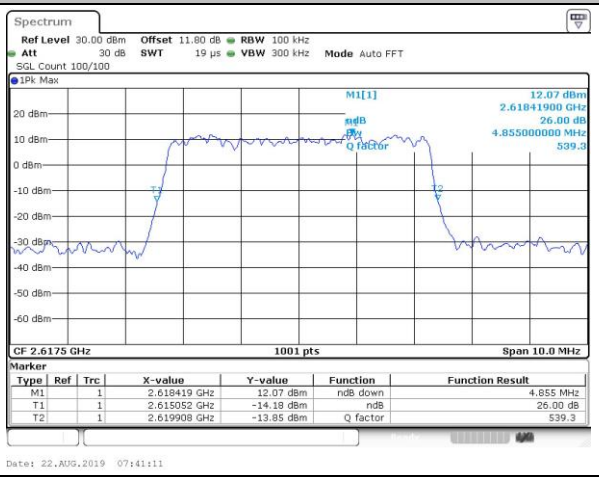
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

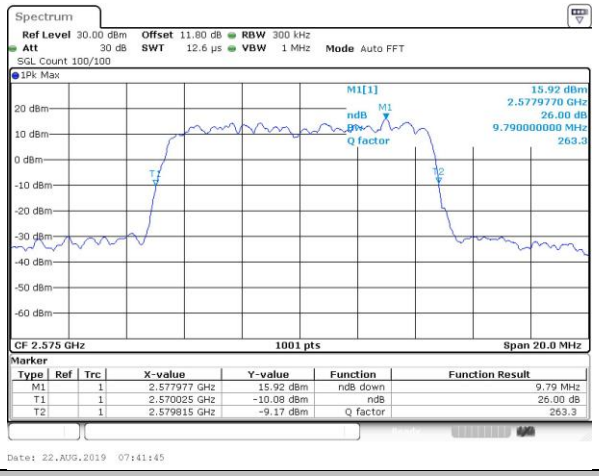


Highest Channel / 5MHz / 16QAM

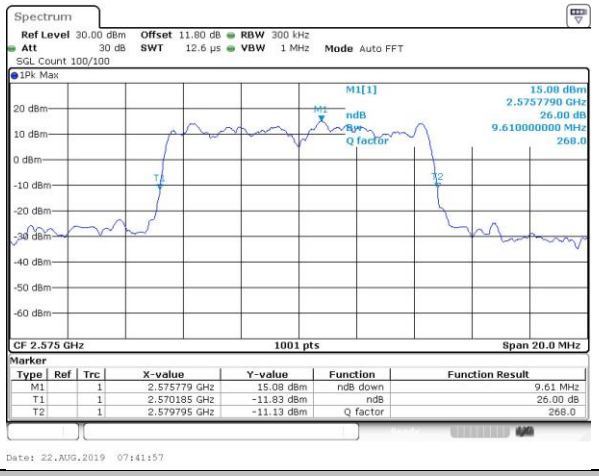


LTE Band 38

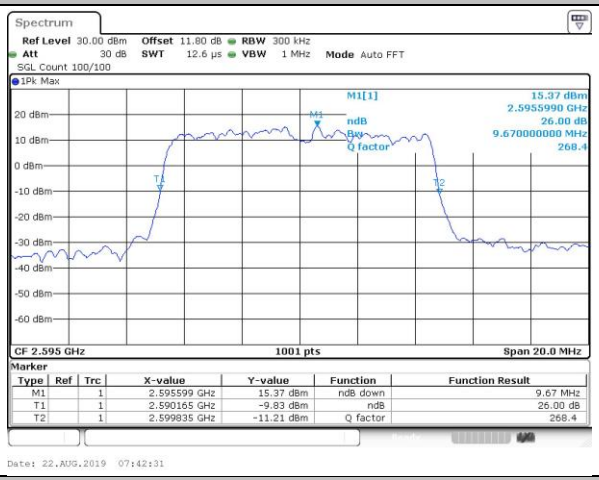
Lowest Channel / 10MHz / QPSK



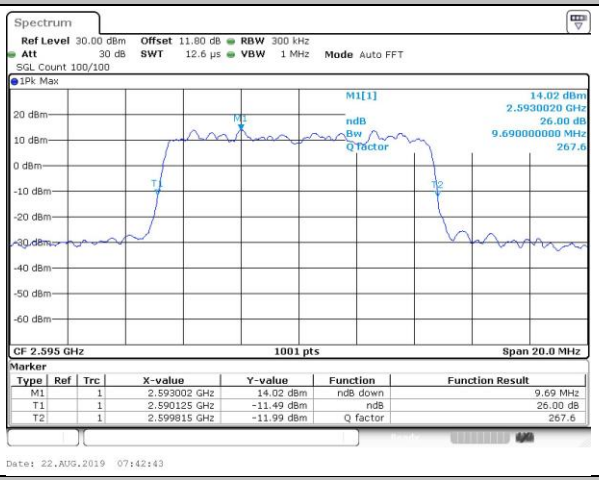
Lowest Channel / 10MHz / 16QAM



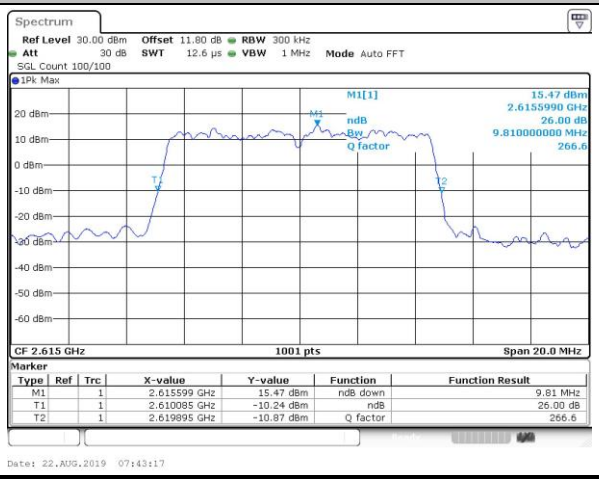
Middle Channel / 10MHz / QPSK



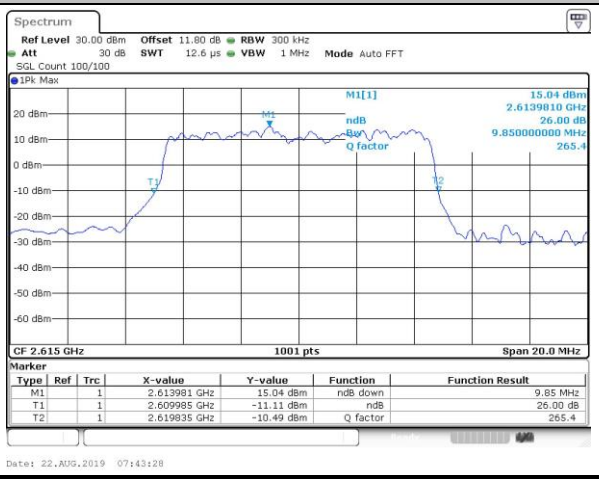
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

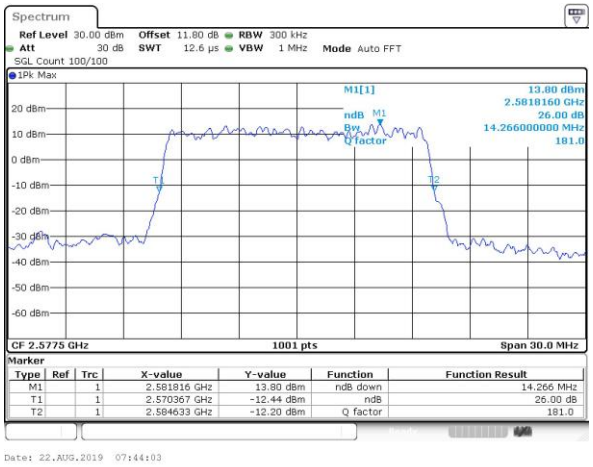


Highest Channel / 10MHz / 16QAM

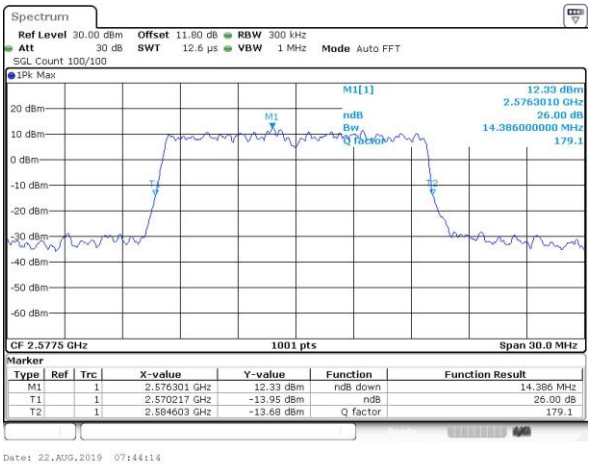


LTE Band 38

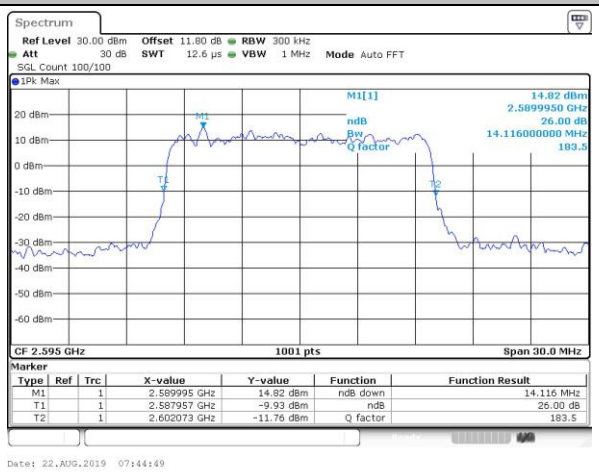
Lowest Channel / 15MHz / QPSK



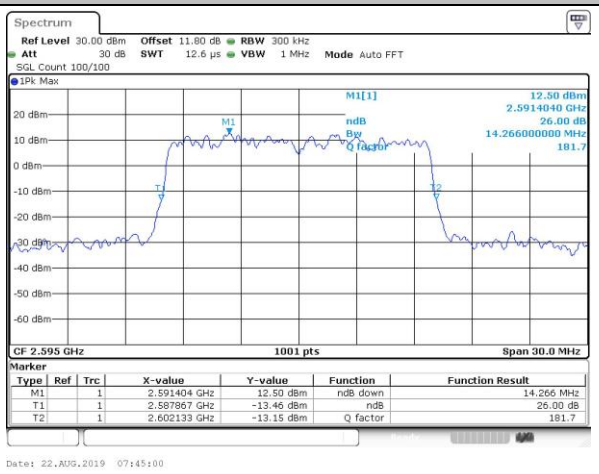
Lowest Channel / 15MHz / 16QAM



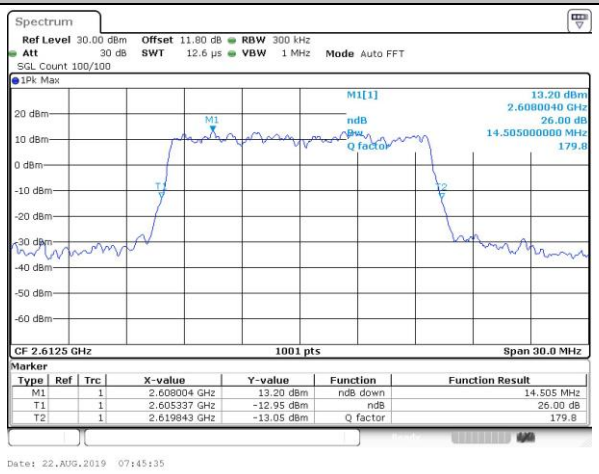
Middle Channel / 15MHz / QPSK



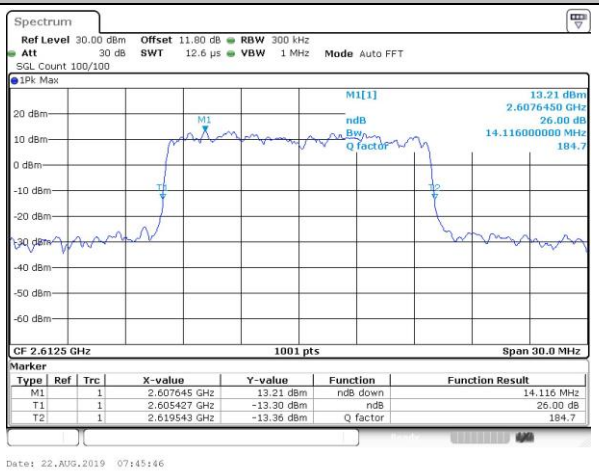
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

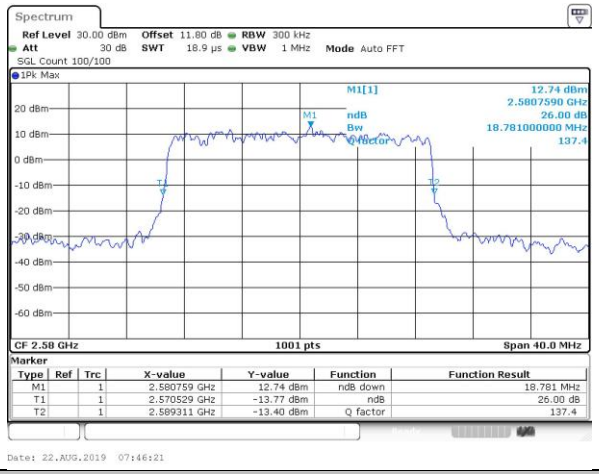


Highest Channel / 15MHz / 16QAM

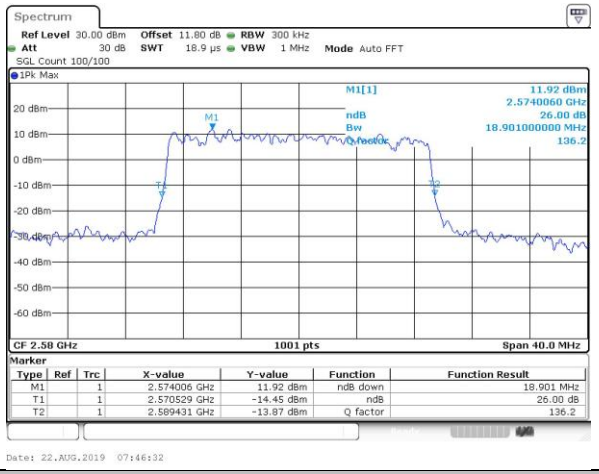


LTE Band 38

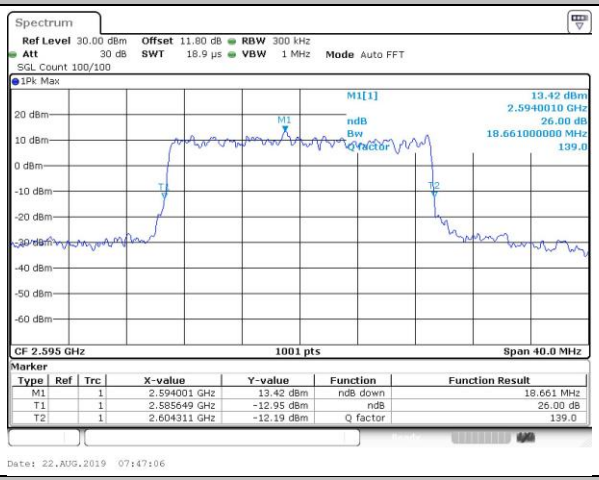
Lowest Channel / 20MHz / QPSK



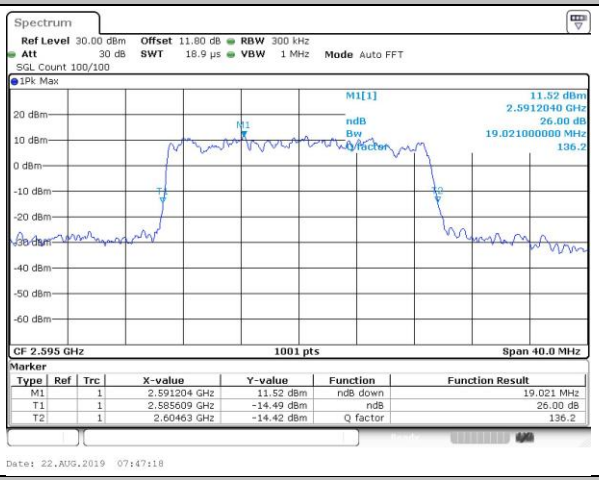
Lowest Channel / 20MHz / 16QAM



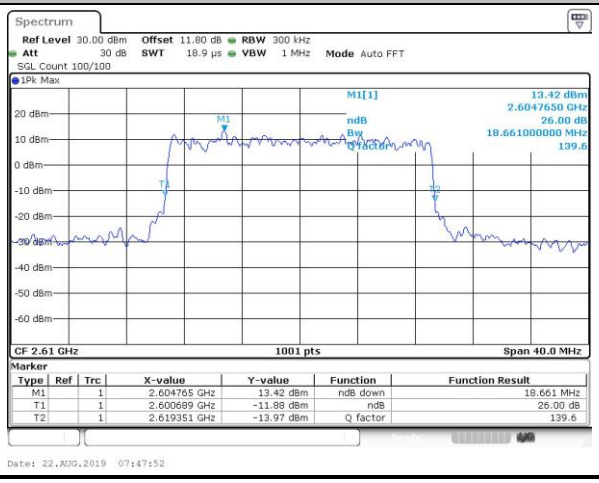
Middle Channel / 20MHz / QPSK



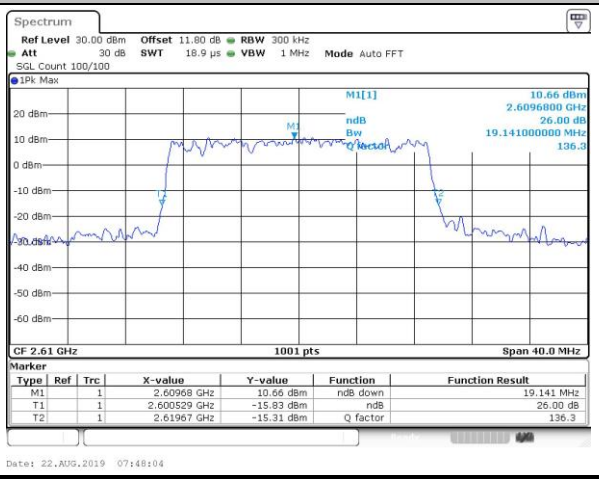
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK

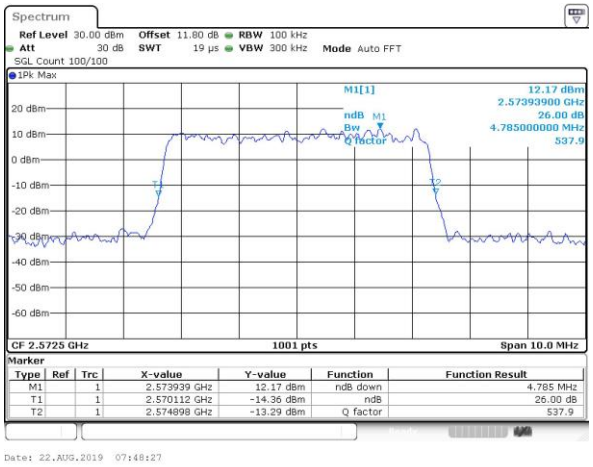


Highest Channel / 20MHz / 16QAM

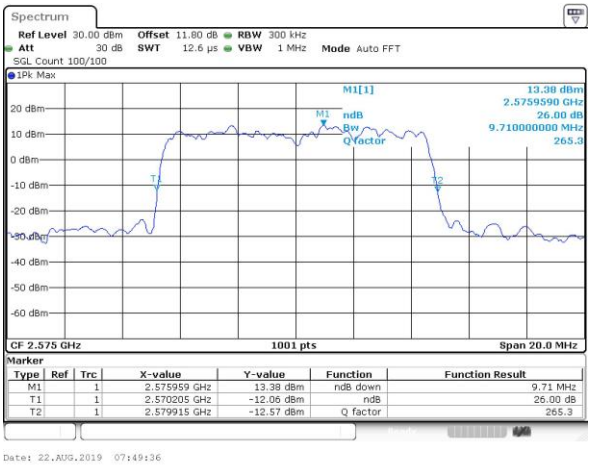


LTE Band 38

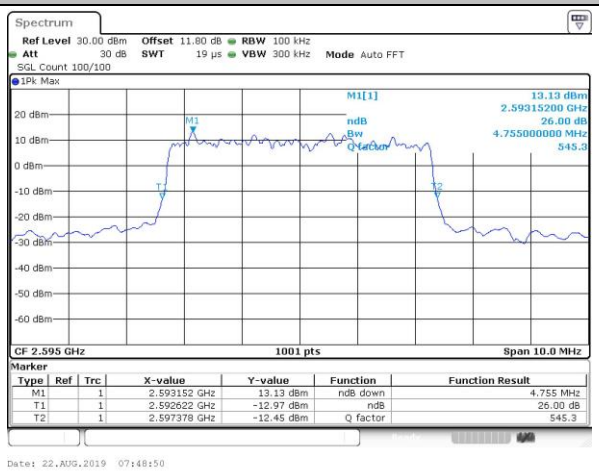
Lowest Channel / 5MHz / 64QAM



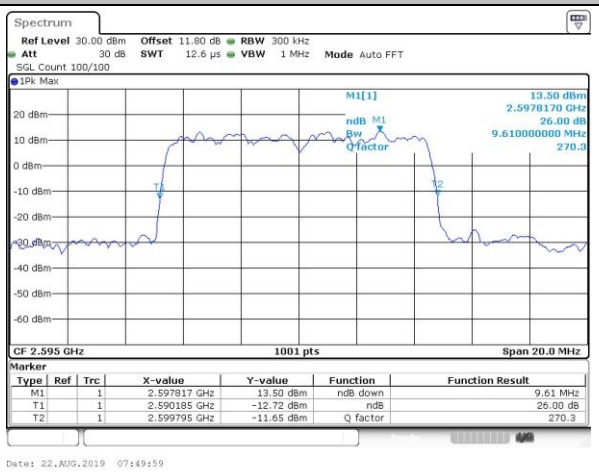
Lowest Channel / 10MHz / 64QAM



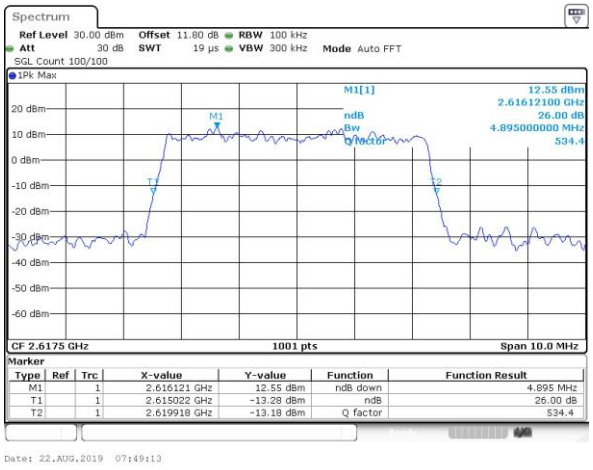
Middle Channel / 5MHz / 64QAM



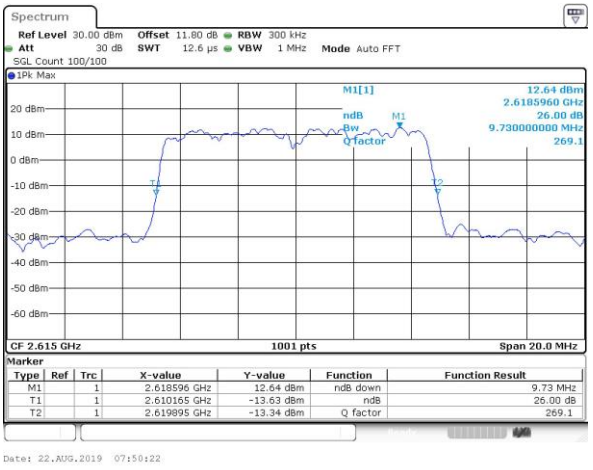
Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM

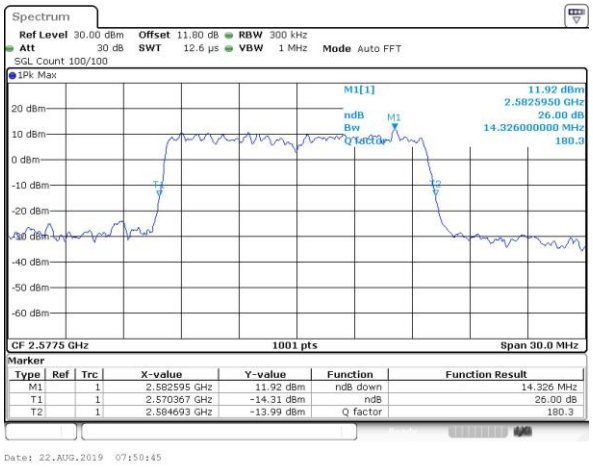


Highest Channel / 10MHz / 64QAM

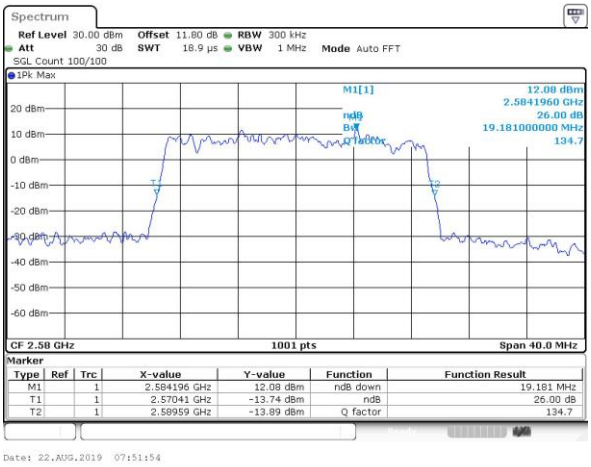


LTE Band 38

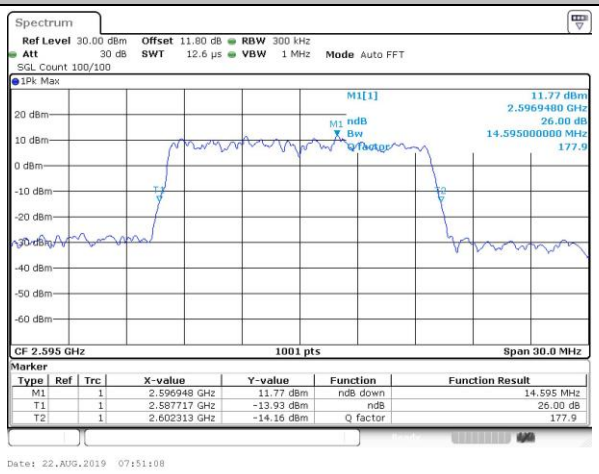
Lowest Channel / 15MHz / 64QAM



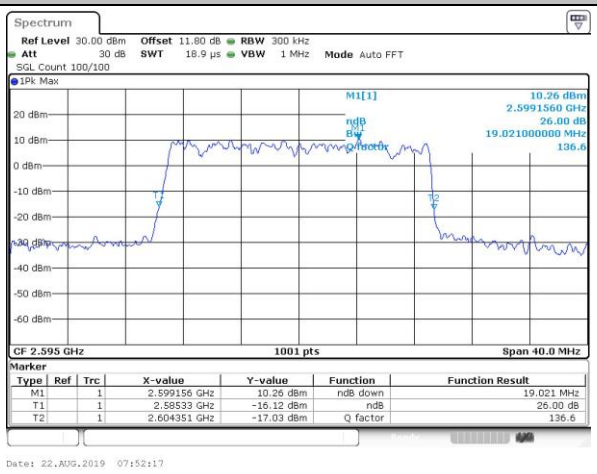
Lowest Channel / 20MHz / 64QAM



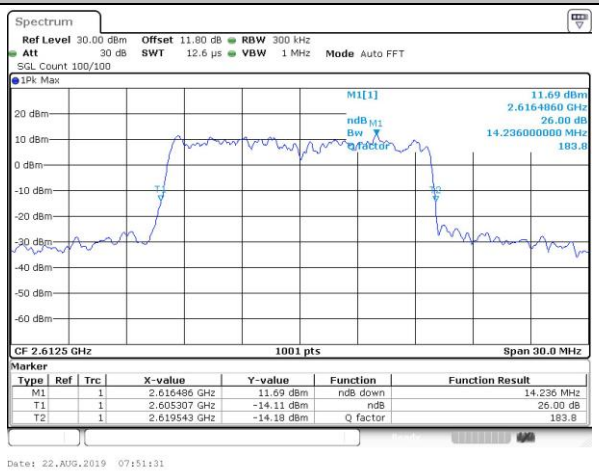
Middle Channel / 15MHz / 64QAM



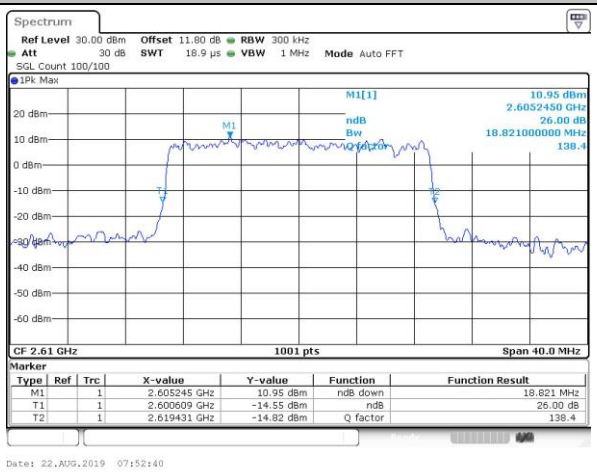
Middle Channel / 20MHz / 64QAM



Highest Channel / 15MHz / 64QAM



Highest Channel / 20MHz / 64QAM

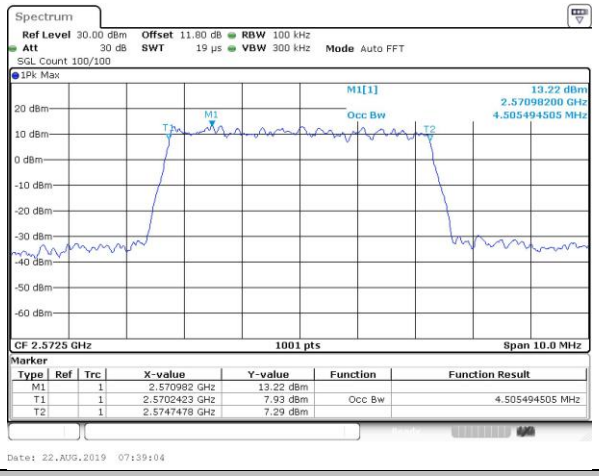


Occupied Bandwidth

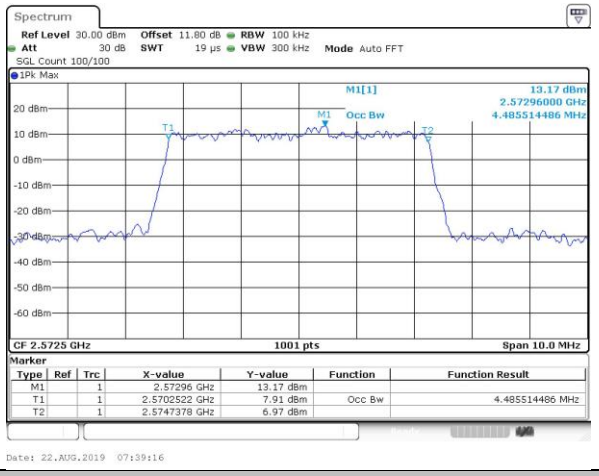
Mode	LTE Band 38 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.51	4.49	9.03	8.99	13.43	13.46	17.82	17.78
Middle CH	-	-	-	-	4.48	4.49	8.89	9.09	13.40	13.46	17.86	17.74
Highest CH	-	-	-	-	4.47	4.49	9.05	9.05	13.43	13.43	17.82	17.66
Mode	LTE Band 38 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	-	-	-	-	4.51	-	8.99	-	13.46	-	17.86	-
Middle CH	-	-	-	-	4.49	-	8.99	-	13.43	-	18.02	-
Highest CH	-	-	-	-	4.50	-	9.07	-	13.43	-	17.94	-

LTE Band 38

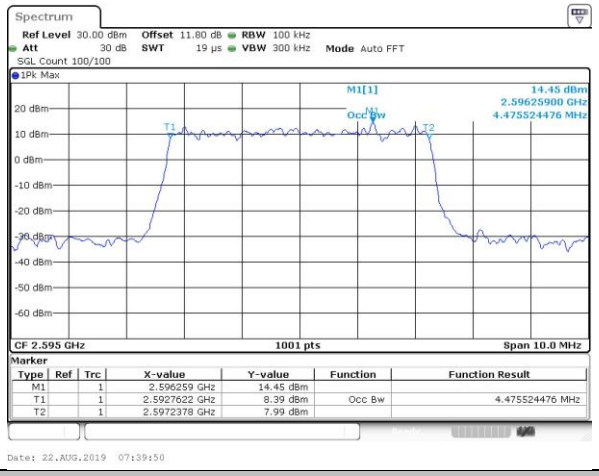
Lowest Channel / 5MHz / QPSK



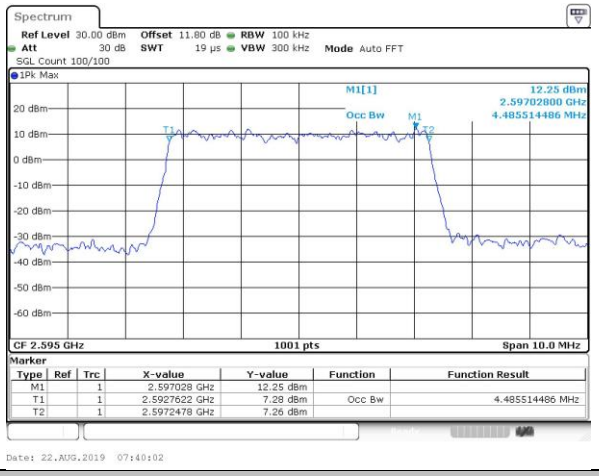
Lowest Channel / 5MHz / 16QAM



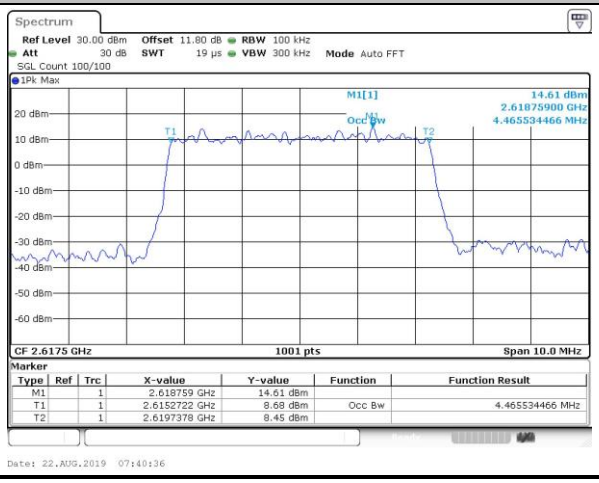
Middle Channel / 5MHz / QPSK



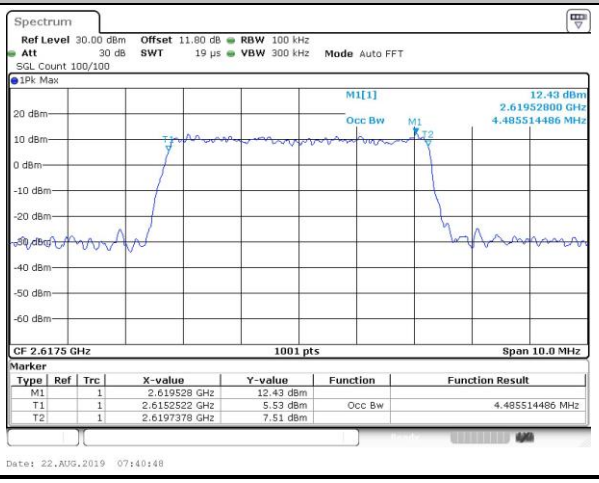
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

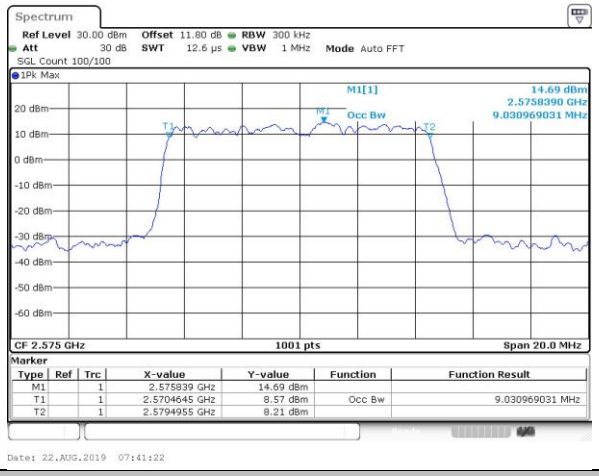


Highest Channel / 5MHz / 16QAM



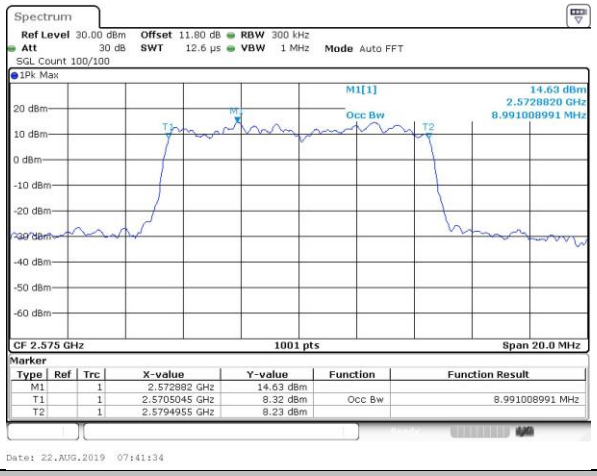
LTE Band 38

Lowest Channel / 10MHz / QPSK



Date: 22.AUG.2019 07:41:22

Lowest Channel / 10MHz / 16QAM



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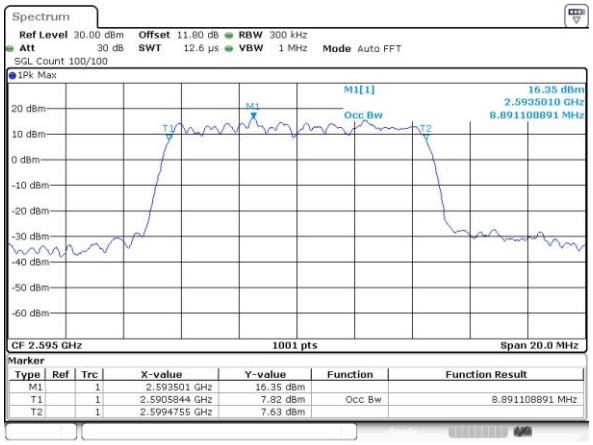
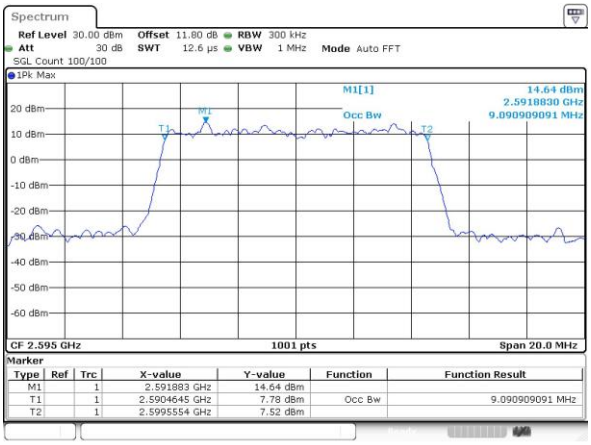
Middle Channel / 10MHz / QPSK



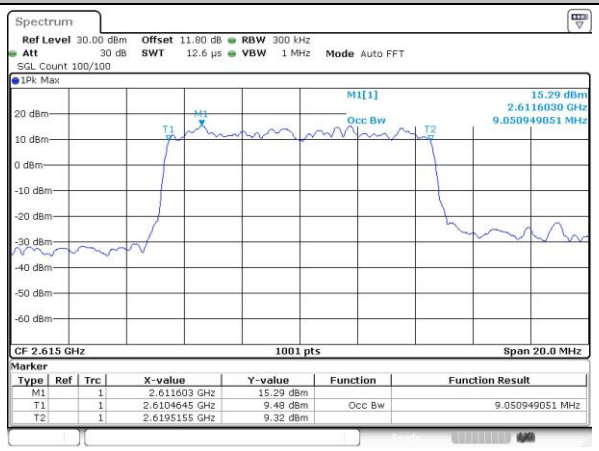
Date: 22.AUG.2019 07:42:08

Middle Channel / 10MHz / 16QAM



Date: 22.AUG.2019 07:42:20

Highest Channel / 10MHz / QPSK



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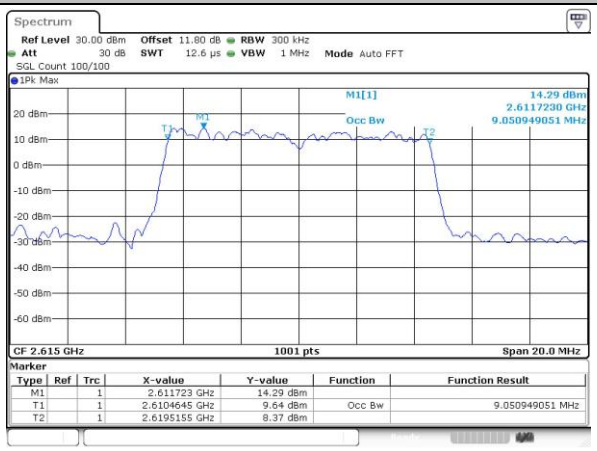
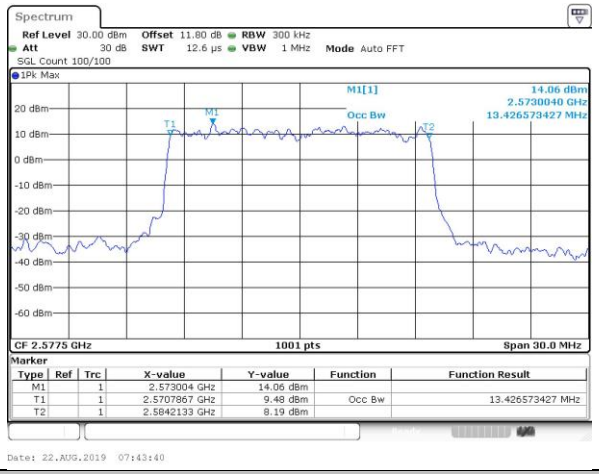
Highest Channel / 10MHz / 16QAM



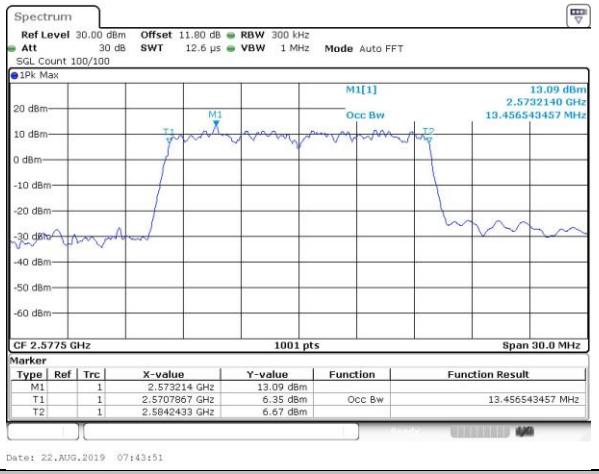
Date: 22.AUG.2019 07:43:06

LTE Band 38

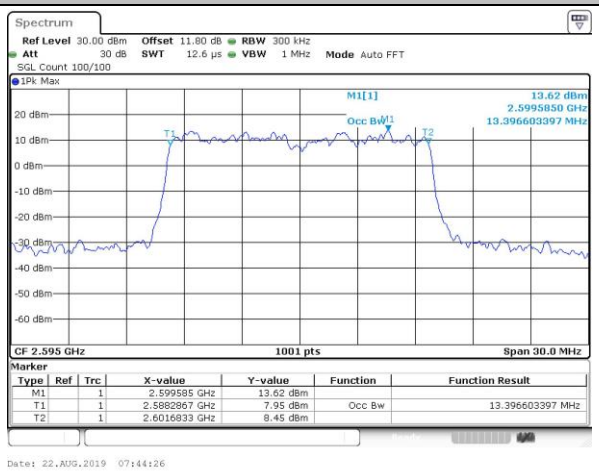
Lowest Channel / 15MHz / QPSK



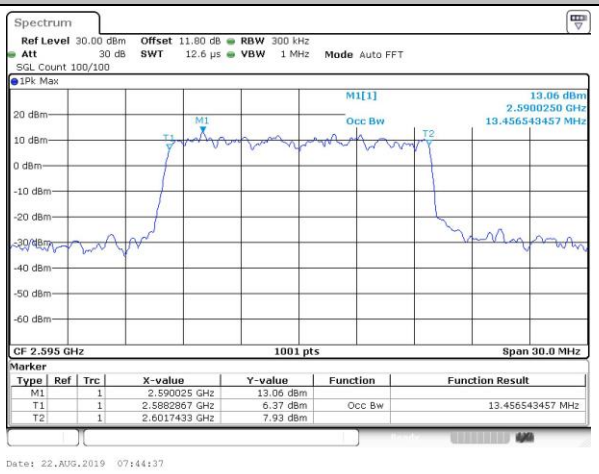
Lowest Channel / 15MHz / 16QAM



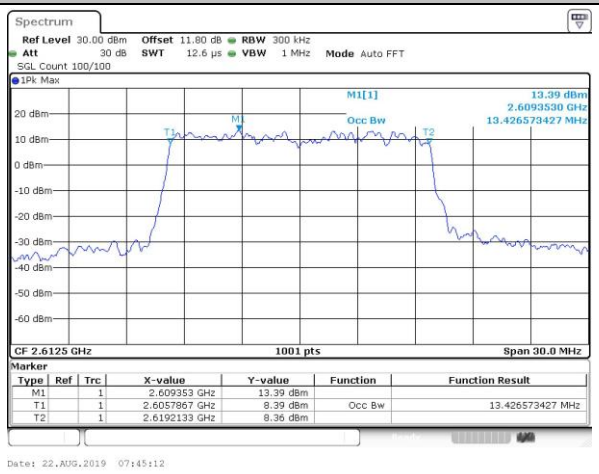
Middle Channel / 15MHz / QPSK



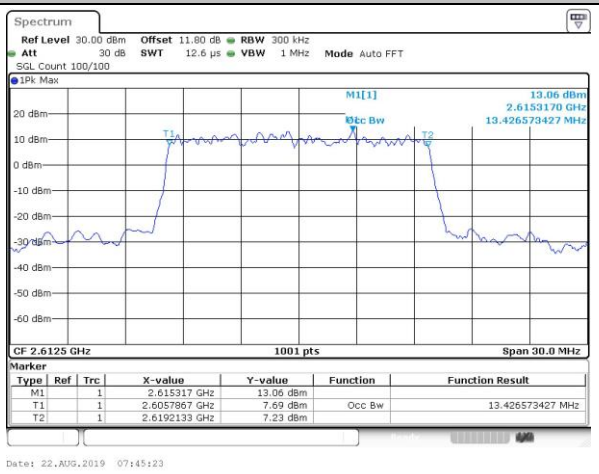
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

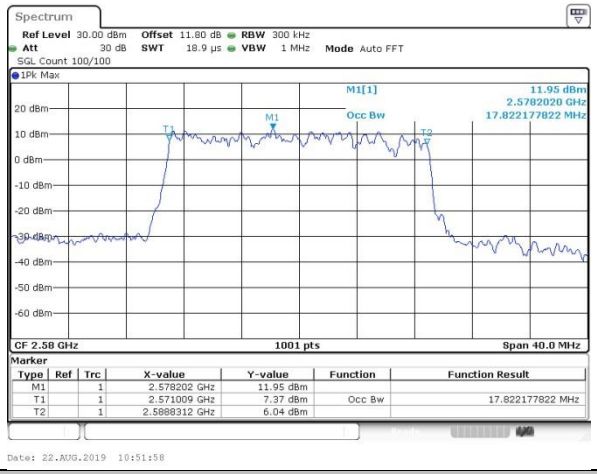


Highest Channel / 15MHz / 16QAM

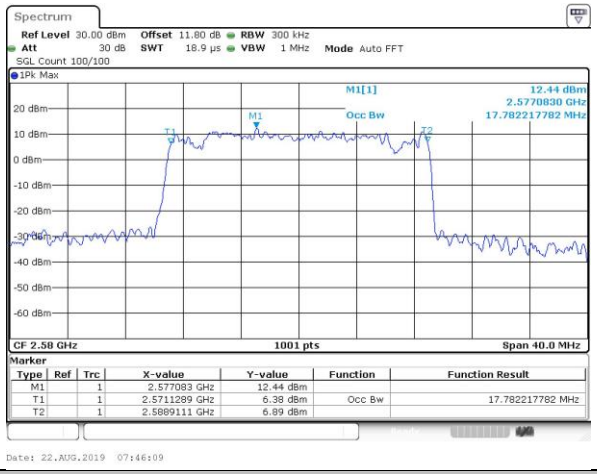


LTE Band 38

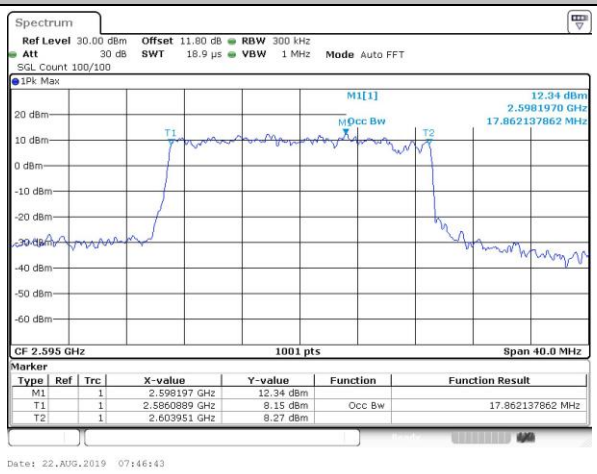
Lowest Channel / 20MHz / QPSK



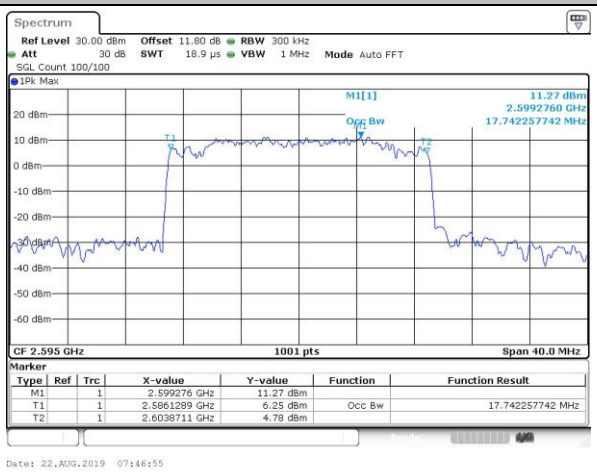
Lowest Channel / 20MHz / 16QAM



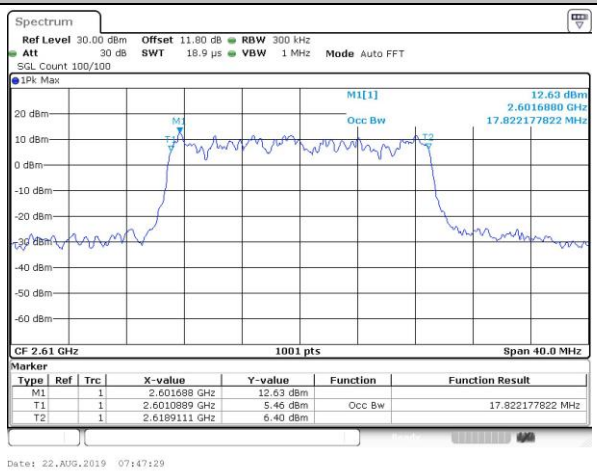
Middle Channel / 20MHz / QPSK



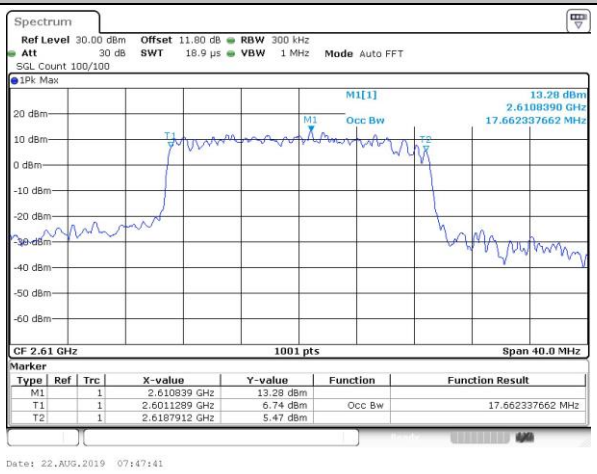
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK

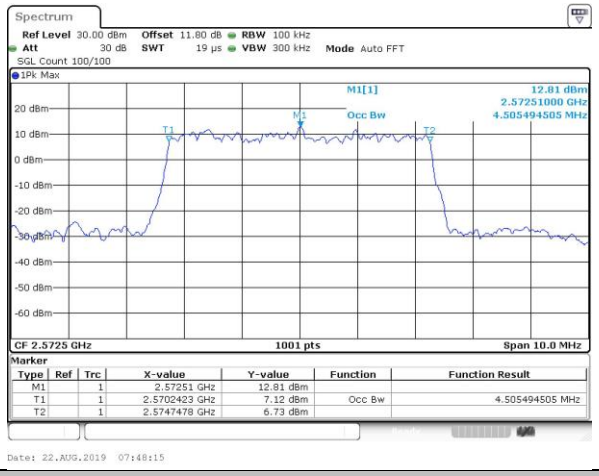


Highest Channel / 20MHz / 16QAM

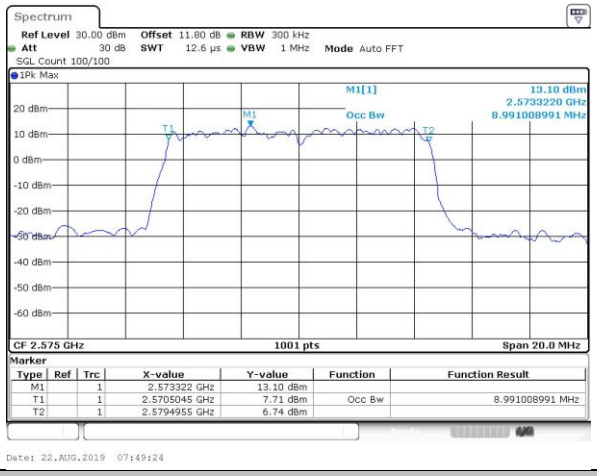


LTE Band 38

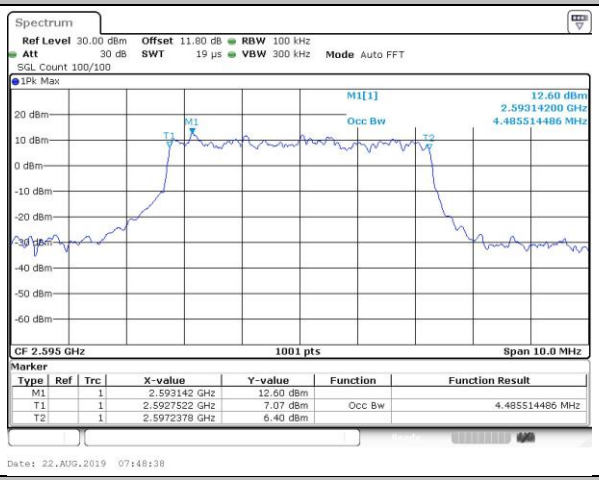
Lowest Channel / 5MHz / 64QAM



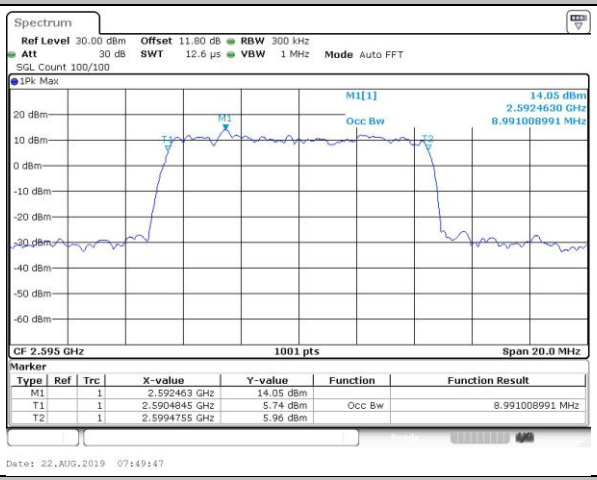
Lowest Channel / 10MHz / 64QAM



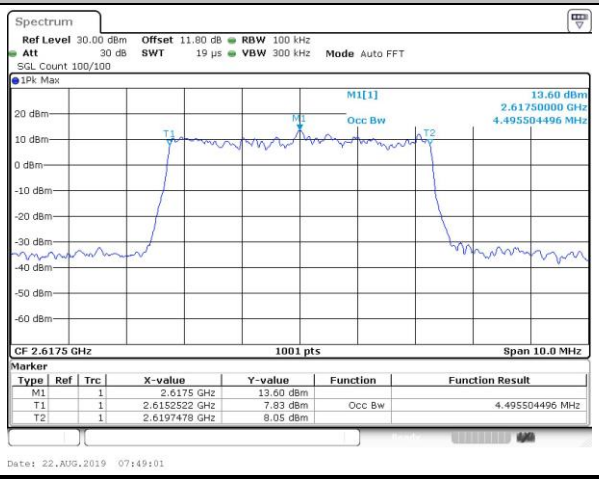
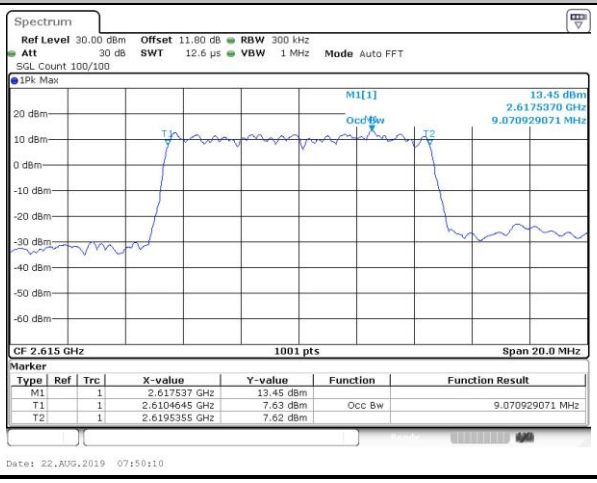
Middle Channel / 5MHz / 64QAM



Middle Channel / 10MHz / 64QAM



Highest Channel / 5MHz / 64QAM



Highest Channel / 10MHz / 64QAM